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THE

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AND OF

THE INSTITUTIONS IN UNION.

110TH SESSION.]

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Announcements by the Council.

PRIZES TO ART-WORKMEN.

The works rewarded by the Society of Arts, and for which prizes have been given, have been placed, by permission of the Lords of the Committee of Council on Education, in the South Kensington Museum, and will be found in the Gallery of the Iron Museum, at the entrance to the Sheepshanks Gallery.

The Christmas subscriptions are now due, and should be forwarded by cheque or post-office order, made payable to the Financial Officer, Samuel Thomas Davenport. All cheques and post-office orders should be crossed through Messrs. Coutts and Co.

Proceedings of Institutions.

SOUTHERN COUNTIES ADULT EDUCATION SOCIETY.

The following paper, "On Agricultural Instruction on the Lower Platform," by W. Wallace Fyfe, Esq., of Charminster, Dorset, was read at the annual meeting of this Society, held at Devizes:—

In October, 1861, I had the honour of submitting to the Society at Dorchester, a new method of imparting Agricultural Science. That scheme, subsequently ventilated by the exhibition of my great sheet Farm Calendar and large type catechism, in the International Exhibition of 1862, and anxiously discussed, first before the Science Congress, in the Guildhall of London, and subsequently in the columns of the newspaper press, has been excepted to, because in the opinion of some we are not in a position to teach science to the unlettered mind. My present purpose, therefore, is to inquire what can be done on lower ground; for it is obvious that there is a great deal of common practical matter-of-fact information which, whether we choose to call it scientific or not, it would be advantageous to have communicated to the rural adult population in a methodical way, and in a satisfactory form; information which is in every way becoming more and more essential to their successful pursuit of their calling, but which it is left entirely to the chapter of accidents to supply them with. In a paper before the Social Science Congress in Edinburgh, I have endeavoured to illustrate the difference that is found to exist betwixt instruction formally and exhaustively conveyed to a man on any subject, however familiar, such as the common plough, and the imperfect, crude, and undigested notions he is likely to adopt, though founded on his own experience, when left to the untutored guidance of his own

devices. Every man who can handle a plough is well enough aware, for instance, that it possesses working parts of different shapes, passing under different names, and serving different uses. Every skilled ploughman can doubtless take all these to pieces, and put them together again, judge when anything is amiss with them, and detect and remedy their common mechanical derangements. So in like manner he is well aware that the horses which draw his plough possess distinct and different parts, most of which he can, from long acquaintance, name familiarly, down to the hoofs, fetlocks, and pasterns, fore-arms, hocks, withers, and so forth. Now, suppose any of these men were to be brought up for competitive examination on the subject of the plough, before this Society's Examiners, should they at any future time decide on cultivating a little advanced and practical, as well as a great deal of elementary and literary knowledge, he would find that although the questions to be asked him were simply what he would esteem himself foolish not to know, he could not perhaps readily or perfectly answer them. Suppose it were put to him to say what are the twenty working parts of the improved solid or trussed beam plough? And what are those parts, their uses, and places in the composition of the instrument? I don't pretend to say that the man would be puzzled, because if you gave him time he might not, but I am perfectly sure he would be plucked on that examination, and my reason for thinking so is that the plough with all its complications (many of them modern) is clearly a study, and a proper subject for instruction. If such be the case with the plough, by far the most perfect implement of agriculture, yet one which, modified and improved as it may have been, never has, and never can have departed from its primitive simplicity of pushing the clod asunder, how much more must this necessity arise in regard to other agricultural machines and implements which we yet expect our common and unskilled labourers to approach and handle utterly devoid of initiation. Not only, however, in regard to machinery, but to every matter of importance in the rural economy is this observation capable of being applied. The weather, about which everybody knows all that can be known, is precisely one of those subjects on which our information has of recent date received the most marvellous extension and expansion. Forecasts of the weather are now made and applied with an intrepidity and success which would a few years ago have been pronounced impossible, or empirical. A degree of confidence is gained by the agriculturist in common with the navigator, in the regulation of his movements which he never possessed before; and this again illustrates the difference betwixt rational study and random observation. There is, in fact, no subject in the range of country occupations but is capable of being mastered in detail as completely as it now seems to be caught up by intuition; and surely if intelligible results such as those above alluded to are to proceed from the introduction of method into these matters, it is worth while considering whether a professional training of some kind cannot be imparted to the agricultural labourer. The mass of matter which is open to be dealt with either in night schools, where this idea might be adopted and engrafted on the other educational procedure, or in rural

clubs organised under competent auspices for mutual instruction, or by any of the means adopted in mechanics' institutes, is no doubt great, and its detail is various. I have been lately investigating, for example, the subject of farm seeds and seedling. I find that in the single article of seed wheat alone, there are seventy named varieties in common use in this country, possessing distinct shades of difference in shape, colour, and quality, earliness or lateness, productiveness, hardihood, and so forth; and that were a museum of such things formed in every rural district, for the purpose of familiarising cultivators, by means of actual study and example, with the properties and characteristics of all our cereals and other grains and products, there could not be conceived, perhaps, a more important advance in agricultural information. The same thing occurs to the mind and develops itself to the same extent, as regards the nature, varieties, and proper treatment of cattle, sheep, and horses; the operations in husbandry generally, the uses and values of manures and their application; the management of the dairy, the growth of wool, and the securing of crops. The proposition to give general, perhaps universal instruction, in place of chance and accidental skill on all such points to the husbandman, may be met with the objection, that although there are, or may be, experts, who could enlighten those around them on their particular specialities, the general and comprehensive scope of the instruction required altogether precludes the chance of finding instructors. If, however, it is once admitted that the peasant wants agricultural training of some kind, as much as the sailor wants to be taught how to splice a rope or rove his tackle, how to name his ropes and how to handle them, as much as any tradesman or operative has need to be instructed in his calling, we must cast about in order to do the best we can to supply that want. As I have already hinted, new schools or rural institutes might, by dint of organisation, be brought to supply this useful, practical, and available instruction. It must be owned that the best and most satisfactory means would be to provide trainers for the men out of the superior grades of their own order, and to have them properly and fittingly instructed themselves, so as to be able to direct and systematise the mastery of each successive department through which it may be found desirable for the men to pass. With moderate aims, and avoiding everything but practical objects, it does not seem as if the difficulties in the way of accomplishing this were at all insuperable. Many an employer would at this moment be glad of such a chance of putting his hands in the way of better qualifying themselves for the tasks they are called upon to perform, and the hands themselves would discover that a dignity would be added to their labour, in proportion as their intelligence was brought to bear upon it, as well as their physique. All that is now argued for, is some mode of teaching the agricultural labourer what he is about, what is the meaning of any operation in which he may be required to take a part, and how he may best and most satisfactorily perform it. There is no performance in which a skilled workman does not play a better part; and there is no reason for singling out agriculture from all other employments for the purpose of entrusting to unskilled labourers its complicated mechanism, its costly stimulants, its valuable livestock, and the hopes and prospects of its inestimable produce. The interests staked in these incompetent hands are enormous—more than enough, at all events, to induce us to give a thought to the means of obviating so much that is amiss in all that relates to the rural mind and intelligence. But if something be not done, and that shortly, to supply instruction conformable to the rapid race of agricultural improvement, high farming must relapse into a theory, and practical agriculture become abortive, for want of labourers capable of carrying through the grand developments of the age. This is no idle threat. I have known parts of the country where the superior system of farming could not be carried on, simply because the labouring people could not and would not com-

prehend or aid it; and nothing is more certain than that the rustic must be plainly but practically instructed in his business like the rest of mankind, and not left stationary whilst all else are moving.

The following paper, "On the Method of Establishing a Public Building for the Uses of various Institutions and Societies in Provincial Towns," by H. Thompson, Esq., Andover, was also read:—

Exactly six years since I had the honour of submitting to this Society, at their Conference at Basingstoke, a paper "On the Causes of Failure in Local Societies, &c., and Suggestions for obviating the same." I therein stated my presumption that failure arose from a want of united action and concentration in one locality. My paper went on to state how those difficulties might be met and overcome, how the result would be a general benefit, and the end costless. It is, therefore, with no little pleasure that I again venture to tax the time of your valuable Society by stating the method of an attempt to put this scheme into action, and the probability of success that may attend it.

Suitable premises being in the market, a scheme was put on foot to raise one thousand pounds in two hundred shares at £5 each, bearing interest at 3 per cent. per annum. Nine hundred pounds were raised, the highest shareholder embarking £50, and very many only £5. The premises were purchased at £900. The repairs, alterations, &c., will cost £100 more. It will, perhaps, be well (clearly to carry out the exemplification) to state the capital embarked at £1,000.

The premises having been so arranged as to admit of it, the room is thus appropriated. On the ground-floor is the depôt of the Society for Promoting Christian Knowledge, and the keeper's residence; on the first-floor the largest room is a library, containing the book-cases of the Institute, with nearly 2,000 volumes of standard works, the gatherings of many years. This room would accommodate thirty students. Two other rooms are appropriated as reading-rooms, and are equal to accommodating a like number. A room is rented as an office by her Majesty's Board of Inland Revenue, and beyond that there is a large room capable of being used as a lecture-room, or (as I hope) a museum. On the upper floor two large rooms are occupied by the School of Art, with accommodation for 40 pupils, one being appropriately lighted by a roof lantern, and there are two other rooms that can be used as class rooms. The other parts of the premises are let to tenants at rentals to be hereafter stated. I now come to the financial statement, premising that the shareholders having agreed to receive only 3 per cent. per annum in consideration of the object in view, all surplus (after payment of interest, rates, &c.), is to be appropriated by trust deed to the redemption of capital, so that eventually the building may become a free and unencumbered public institution, for the purposes to which it is now devoted.

The following statement of rents and outgoings will show whether the plan be feasible and financially secured, and they will show also, as I hope, that, after satisfying all claims, the end desired is likely to be attained:—

INCOME PER ANNUM.

3 rooms, let as reading-room and library ...	£12
1 " Society for the Promotion of Christian Knowledge, as Depôt	12
2 " Government School of Art	12
1 " Office of Inland Revenue	15
Premises let as shop, &c.	25
Stores	10
	—£86

EXPENDITURE PER ANNUM.

Rates, insurance, and repairs, say £20	
Incidentals	6—£26
	£60
Deduct 3 per cent. on £1,000	30
Annual surplus	£30

The rents allotted to the public institutions being reasonable, and the other premises letting readily at the sums set opposite to them, it is not too sanguine a hope that they may continue readily to pay these sums, and in that event the whole capital will be liquidated in twenty years, and the premises become a public institution, free and unencumbered.

Thus have I endeavoured to show how, by small means, united action, but, above all, patience and forbearance towards each other, large ends may result in such undertakings, and I add my fervent wish for the success of the effort that I have described.

MANCHESTER MECHANICS' INSTITUTION.—At a recent meeting of the Directors a resolution was unanimously adopted receiving with great regret the resignation by Mr. Edwin Simpson of the office of secretary, on his appointment to that of Master and Secretary of the Manchester Royal Exchange. The Directors record their entire satisfaction with the ability, judgment, and zeal with which Mr. Simpson has discharged his varied and important duties.

MARLBOROUGH READING AND MUTUAL IMPROVEMENT SOCIETY.—The nineteenth annual report, presented at Michaelmas last, notices its continued prosperity, the balance in the treasurer's hands being £39 18s. 4d., an increase of nearly £10 to that of last year. Additions have lately been made to the library to the extent of 50 volumes, at a cost of £12. In referring to the success of last season's lectures—in proof of which the Committee refer to the crowded state of the assembly room on several occasions—they express regret that a larger room is not available for such purposes. Among the lectures delivered or announced are "The Last Days of Eminent Men," by Dr. J. C. Daniel; "The Construction of the Animal Frame," by B. Waterhouse Hawkins, Esq.; "Ghosts and Apparitions," by Joseph Simpson, Esq.; "The Sea, a Highway, a Battle Field, and a Grave," by Allan Curri, Esq.; and "Ill-used Men," by George Dawson, Esq.

EDUCATION AND THE POLICE FORCE.

On Wednesday, the 23rd ult., Mr. Harry Chester addressed a large body of the Metropolitan Police, at Poplar, in explanation of the advantages derivable from the examinations of this Society and the Metropolitan Association for Promoting the Education of Adults. The meeting was held in the large school-room adjoining the police-station and opposite to the parish church of Poplar. Besides the Rev. T. Nowell, Rector of Poplar, and his curates, there was no one present but members of the force. The subject appeared to have excited considerable interest amongst them, as they mustered in large numbers, and kept dropping in, as they came off their beats, up to the very close of the address. Mr. Harry Chester explained that he had been invited by the Rector to address the Policeman's Mutual Improvement Class, which holds its meetings in the room in which they were then assembled. In addition to the usual explanations of the simple preparatory examinations held by the Metropolitan Association and its Local Boards, and the advanced examinations held by the Society of Arts itself, with their respective certificates and prizes, Mr. Chester pointed out how peculiarly important to a policeman were the advantages to be obtained from education. No one could enter the police force without being able at least to read and write. There was an excellent foundation, but only a foundation, for a really good education. Of two policemen having equal natural abilities, and equally good characters, but one improving, and the other neglecting to improve, his abilities by education, there could be no doubt that the former would be the happier man and the more useful and successful policeman. He would be better able than his comrade to understand what he saw, and to draw just inferences from it, to understand and obey his instruc-

tions, to appreciate and report facts with correctness, to give clear and accurate evidence, to stand the badgering of counsel without being confused, and he would have a much better chance of being employed in important matters, and of obtaining promotion. With a view to this promotion he ought to be always improving his education. That which sufficed for a constable would not suffice for a sergeant, nor would that which sufficed for a sergeant suffice for an inspector or a superintendent. There was a peculiarity in the case of policemen which they would do well to bear carefully in mind. In other services men commonly died in harness, and were very rarely able to put it off before they had attained to old age. But with this force it was just the reverse. After a comparatively short service every policeman with a good character was entitled to his discharge and a pension. What were they to do with their leisure? How were they to add by their own exertions to the amount of the pension, insufficient in itself to maintain them? Nothing was more wretched or more ruinous than leisure to an ignorant man, and there were few means of gaining a livelihood satisfactorily open to an ignorant ex-policeman. But a well-educated ex-policeman was quite a different being. To him leisure was a blessing, because he could well employ it, and there were abundant openings for him, with his good character, his understanding mind, his improved manner, and his partial pecuniary independence, to obtain employment in positions of trust and respectability. In conclusion, Mr. Chester stated that he was very glad to find that improvement classes, similar to that at Poplar, were spreading in all the divisions of the police of the metropolis, and he would with pleasure give similar explanations wherever they might be required.

Fine Arts.

SCHOOL OF FINE ARTS IN PARIS.—The Superior Council for Instruction, in connection with the Imperial and Special School for Fine Arts, the formation of which was prescribed by the 7th article of the decree of the 13th November, 1863, has just been constituted by his Excellency the Minister of the Emperor's household and of Fine Arts, as follows:—The Duc de Morny, Honorary President; the Superintendent of Fine Arts, President; the director of the administration of Fine Arts, Vice President; Messrs. Leon Cogniet, painter, member of the Institute; Muller, painter; Duret, sculptor, member of the Institute; Cavelier, sculptor; De Gisors, architect, member of the Institute; Lefuel, architect, member of the Institute; Forster, engraver, member of the Institute; Dumas, senator, member of the Institute; Mérimée, senator, member of the Institute; Noizer, General; Théophile Gautier, author.

DISTRIBUTION OF PRIZES TO THE EXHIBITORS OF THE "SOCIÉTÉ DES BEAUX-ARTS APPLIQUÉS À L'INDUSTRIE" AT PARIS.—The *Monteur* gives a long account of this proceeding, of which the following is an abridgment:—This event took place on the 14th December, at the Palais des Champs Élysées, and was not only well attended by those to whom prizes were awarded, but also by those who came to applaud their more successful opponents. The ceremony was held in one of the large cross galleries on the first floor of the palace. Arrangements, which were elegant without being superfluous, had been made to receive the president, vice-president, members of the committee of organisation, as well as for a choir composed of Orpheonists, under the superintendence of M. Armand Cheve. At eleven, the reserved seats were full. At twelve a.m. the president, M. le Baron Taylor; the vice-president, M. Tresca; M. Guichard, M. Cardailhac, and M. Julien arrived. M. Guichard then proceeded to deliver a speech. Having briefly alluded to the medals presented by the Emperor and Empress, he proceeded to explain how this exhibition should not be confounded

with the industrial exhibitions hitherto held. The juries of the latter were pre-occupied with numerous important considerations, entirely independent of art. Beauty of form, happy harmony of colour, clever execution—in fact, art, was shown by him to be the data on which the jurors of this exhibition based their verdict. He then explained how, for this reason, several exhibitors had been denied the right of competition. M. Guichard terminated his speech with an announcement of the financial results. The receipts amounted to 77,000fr.; the expenses were about 45,000fr.; and a fund, founded by Baron Taylor, for the assistance of inventors and industrial artists, was about 32,000fr. M. Guichard's address was followed by one from M. Tresca, of which the following is the substance:—This second exhibition is larger than the first, but represents but poorly the industrial art of France. The jury is divided into several sections, each of which presents a report. The section for Painting have most particularly accepted the task of appreciating original works, due either to the pencils or to the brushes of our industrial artists. This appreciation has been made felt in M. Barty's report, with a taste which cannot but be appreciated by all, when the reports shall have been distributed. The section for Engraving have included under their task the necessity of examining every species of reproduction, whether by lithography or photography. Our engravers on wood have no further cause to be envious of foreigners. Our litho-chromes and printings in colour hold good comparison with those of England. M. Rohault de Fleury has preceded his report on sculpture by an attempt to re-establish the true rules of good taste, and by warning artists against a too great abundance and richness in details. Our celebrated bronzes have called forth the especial attention of this section. The jury for Ceramic Art have signalled the truly marvellous progress which has been realised lately. The celebrated Minton has shown in England the influence which an energetic man can exercise on industry, when he knows how to ally technical knowledge with taste for form. Minton has caused a revolution in English pottery, and thus it is that our French artists enviously follow on his track. Messrs. Kastner and Bouillon have examined the musical instruments. It is, perhaps, for the first time, that the elegance and musical qualities of each instrument have received the same and equal care. Drawing schools have been invited to take part in the exhibition; 52 schools have done so. The necessity of weighing the merits both of master and pupil has imposed on the jurors the obligation to carry their investigation as far as possible. The exhibition of arts applied to industry satisfies that desire, which founded the South Kensington Museum, which opened the Congresses at Brussels, which put the Campaña Museum in our possession, and which daily increases the appreciation of the riches of the Hotel Cluny. Our exhibition is, perhaps, the modest standard of this era of science and reason, and it should express the state of artistic production at this time. At the conclusion of M. Tresca's address, M. le Baron Taylor rose amidst the warmest applause. He reverted in general terms to the flourishing condition of these exhibitions, and to their gradual improvement. "Never forget," he said, "that the study of the highest art should always be your guide, and the predominating cause of your success." He assured the exhibitors that encouragement and reward would never be wanting on the part of the Emperor, or of his minister of commerce and public works. The proceedings terminated with M. Tresca's proclamation of the list of successful exhibitors; and after the excellent execution of a cantata, composed expressly for the occasion, the assembled multitude separated.

EXHIBITION OF THE WORKS OF MR. MULREADY, R.A.—The following minute has been passed by the Committee of Council on Education; and Mr. Sketchley, late Superintendent of the Picture Department of the Exhibition of 1862, and Secretary of Commission on the Royal

Academy, has been charged with the executive duties for carrying it into effect:—"My lords observe with regret the death of Mr. Mulready, the Royal Academician. In 1843 the Society of Arts formed an interesting exhibition of Mr. Mulready's works executed up to that time. Since then his works, and especially his life studies, have largely increased. Through the liberality of Mr. Sheepshanks, the Science and Art Department possesses numerous specimens of Mr. Mulready's art of all periods, and a series of his studies of the human figure has been acquired for the use of the schools, and circulated among them. Their lordships propose to form another and complete exhibition of Mr. Mulready's works, to comprehend as far as practicable all his oil and water colour paintings, and drawings, which, extending over a practice exceeding half a century in duration, would be of great service to art students in showing his various methods of patient study. Their lordships will accordingly invite the assistance of the proprietors of Mr. Mulready's works in the proposed exhibition. The exhibition will take place in the South Kensington Museum, in the spring of 1864."—HENRY COLE, Secretary.

Manufactures.

ON JAPANESE PAPER.

By P. L. SIMMONDS.

Extensively as paper is employed in Japan, we are not yet thoroughly informed as to the materials of which it is manufactured. A large portion is, we know, made from a species of mulberry, to which Von Siebold has given the name of *Broussonetia Kaminoki*. Whether this is a distinct species from the *Broussonetia papyrifera*, the bark of which is used for making paper in China, or only a variety, is not yet clear. Some young trees of the Japan mulberry are, however, said to have been introduced recently into France in the gardens of the Acclimatisation Society. The tree might be grown in various parts of Europe and America, if the culture were remunerative enough in the yield of bark. It prefers a strong soil, especially of a calcareous nature, and should be planted at intervals not exceeding three feet; otherwise the branches would extend, whereby the bark would become full of knots, causing much loss of substance in the manufacture. The soil is not manured until the second year; in the autumn of that year the plant is lopped close to the root; and this operation, as well as that of manuring slightly, is repeated every second year. 100lb. of branches thus obtained, stripped of their leaves, yield 10lb. of bark. The branches, on arriving at the manufactory, are put into hot water for half an hour; the bark can then be easily stripped off by the hands, and is afterwards left in the sun to dry. It is next macerated for three days in river water and bleached in the sun. These operations having been several times repeated, the bark is at last boiled in a lye of ashes for the space of three hours, then manipulated for some time to separate any epidermis that may have remained; and lastly, when dry, the mass is pounded fine and made into a pulp with water, to which a glutinous liquid extracted from a shrub called *Neboicoico*—probably the *Acacia Nemu*—is added in the proportion of about two pints per cwt. of pulp. The latter is then made into sheets much in the usual way. Sir Rutherford Alcock states that the barks of different shrubs are used, and his collection in the International Exhibition of 1862 contained some 60 or 70 kinds of paper, with the various applications for pocket-handkerchiefs, bank-notes, printing and room-paper, waterproof clothing, imitation leather, &c.

In Kœmpfer's "Amanitates exoticæ," there is an account of the mode of preparing Japanese paper which very much resembles the Chinese. The plants used for the purpose are there called *Kaadi*. The botanical description of Kœmpfer, is *Papyrus fructi mori celæ, sive morus*

saliva, foliis urticae mortuae, cortice papyrifera. According to this description the plant cannot be other than the paper mulberry tree, which, as already remarked, is very like the *ku-chu* of the Chinese.

Every year, after the fall of the leaves, the young shoots, already rather thick, are cut off in lengths of three to four feet, and made up into bundles in order to be boiled in soda ash. They are tied together and placed upright in a very large and closely covered vessel. The boiling is carried on until the bark loosens and the wood is left bare. It is then allowed to cool, and the wood split, in order to remove the whole of the bark, which is then put into water for three to four hours. When the bark is sufficiently tender, the black skin is scraped off, and at the same time the annual bark is separated from the bark of those branches which are not yet so old. The youngest bark gives the finest and best paper. That made from the older bark is blackish but not unpleasant. Bark more than a year old must be thrown aside, as it yields a very coarse paper. Parts which are knotty, thick, and otherwise faulty, are also picked out and very ordinary paper made therefrom.

When the bark is duly arranged according to its different qualities, it is boiled in ley, and during the boiling stirred with a thick rod, occasionally adding fresh ley to prevent its boiling over, and to replace the loss by evaporation. The bark is allowed to boil until it can be rubbed to pieces between the fingers, and forms a paste. To make the ley, two pieces of timber are set crosswise on a tub and covered with straw, upon which are placed wood-ashes, over which boiling water is poured.

The bark after boiling, is taken out of the vessel and washed. This washing is a delicate operation, as it must not be carried too far. If the stuff be only slightly washed, the paper is strong and firm, but coarse, and of little value; if it be too much washed, the paper is beautifully white, but weak, runs, and is useless for writing. Experience only teaches how the washing is to be done, which must be in running water. The stuff is thrown into a strong basket, through which the water only can pass, and continually agitated until it is sufficiently pure.

To make fine paper the stuff is washed twice, but in a cloth instead of a basket, for the more it is washed the more the bark disunites, and the greater the loss. In the process of washing, the knots and other extraneous substances are, as much as possible, removed.

When the stuff is sufficiently washed it is thrown on a strong, smooth wooden table, and beaten by two or three men with sticks, and a hard wooden implement called "kusnocki," until it is as clean as paper. It is now put in water and stirred until it forms a paste. The paste is washed in a tub, into which is then poured a slimy and glutinous fluid, prepared by steeping rice and the root *Oreni* in water. The mixture is stirred with a rod until the three substances are well mixed, and form a liquid and uniform paste. The sheets are then made on forms, which consist of rushes. Nothing now remains but to dry the paper. The sheets are laid on a table covered with a mat, and between each sheet there is placed a board called *kama-kura*, that is, cushion. This board, somewhat larger than the sheet, is of use to remove the sheet subsequently. Each heap is also covered with a mat, upon which a board is laid, and gradually a heavier weight, in order to press out the water. The next day the weight is removed, and one sheet after another lifted with a rod and placed on a thin board, to which it is made to adhere by hand, and then placed in the sun. The thoroughly dried sheets are collected, cut, and taken to the warehouse.

The steeping in rice-water makes the paper white and strong. This is prepared in a glazed earthen pot, in which the grains of rice are soaked in water. The pot is at first slowly shaken, afterwards more quickly, then cold water is added, and the whole strained through a cloth. The remaining rice is put in fresh water, and the process repeated so long as the rice gives a glutinous matter. Japan rice is excellent for this purpose, as it is the whitest and most glutinous of Asia.

The liquid from *Oreni* is prepared by putting the cut and bruised root in water. In twelve hours the water is glutinous. According to the season of the year more or less of this liquid is used, and the whole art of making good paper depends upon the quantity of *Oreni* used.

The coarse paper for packing purposes is prepared in the same way from the bark of the shrub *Kadse-kadsura*.

Japan paper is strong, made in large sheets, and so much like linen that it may be mistaken for it.

Dr. Hawk describes the process much in the same manner. In December, he says, after the tree has shed its leaves, they cut off the branches about three feet in length, and tie them in bundles. They are then boiled in a lye of ashes in a covered kettle, till the bark is so shrunk that half an inch of the wood may be seen projecting at either end of the branch. When they have become cool, the bark is stripped and soaked in water three or four times, until it is soft, when the fine black skin is scraped off with a knife. The coarse bark is then separated from the fine; that from the young branches makes the finest paper. The bark is boiled again in fresh ley, continually stirred with a stick, and fresh water from time to time added. It is then put into a sieve and taken to a brook, and here the bark is incessantly stirred till it becomes a pure pulp. It is now thrown into water, and separates in the form of meal. This is put into a small vessel with a decoction of rice and a species of *Hibiscus*, and stirred until it has attained a tolerable consistence. It is then poured into a large vessel, from whence it is taken out and put in the form of sheets on mats or layers of grass straw; these sheets are laid one upon another with straw between, and pressed to force the water out. After this they are spread upon boards in the sun, dried, cut, and gathered into bundles for sale. This paper will better endure folding and last longer than ours.

ALKALI WORKS.—The Act for the condensation of muriatic acid gas in alkali works, which was passed last session, comes into operation this day (Jan. 1st). The condensation must be effected to the satisfaction of Inspectors appointed by the Board of Trade, and if 95 per cent., at least, of the muriatic acid gas evolved is not condensed, the owner of the works is liable to a penalty not exceeding £50 for the first offence, and £100 for the second offence. The owner is liable in the first instance, unless he can show that the offence has been committed by some agent without his knowledge, in which case the agent is liable. Alkali works must be registered.

ROSE CULTURE IN TURKEY.—M. B. J. Dufour has published, in the *Bulletin de la Société Impériale d'Acclimatation* of Paris, an interesting paper on the natural productions of Turkey, in which he speaks of the rose, cultivated there for its essence, forming an important article of commerce in the east. The rose is specially cultivated in Roumelia, in the district of Philippoli, the inhabitants of which country he describes as more advanced in agriculture than those of other parts of the empire, and as giving special attention to that species of the plant, the essence of which is justly considered by all perfumers as the best of all, though they very often substitute for it in their preparations other essences, such as that of the geranium, which has a considerable analogy to it. The essence is manufactured by the growers of the plant, who use a still for the purpose, like that used in distilling spirits. The distillation is thus carried on. From the 20th to the 25th of May, the period of the annual rose harvest, the country people gather the rose leaves before sunrise, and these they distil in portions of from 8 to 10 okes* mixed with from 10 to 15 okes of pure water, and this goes on without interruption for two hours, after which time the roses are withdrawn. They then distil afresh the rose water thus produced, and afterwards skim with a spoon the essence of roses which floats on the surface. The annual harvest of this species of rose

* An oke is 15 drachms.

amounts to 3,600,000 okes, and the production of essence of roses varies from 200 to 400 thousand meticals,* depending on the meteorological state of the air, which has an important influence on both operations, which extend over a period of about 25 days. The most favourable temperature for gathering the roses, and which is equally important for the production of the essence, is a fresh and almost cold temperature, from 10 to 12 degrees of Réaumur. For example, with a low temperature, accompanied with fog and fine rain for three days, (and this often happens in that country,) 400 roses will weigh one oke, and with eight okes of these roses one metical, or a drachm and a half of essence is obtained, whereas with a higher temperature it takes 1,000 roses to make one oke, and 20 of these okes to produce one metical of essence. But nevertheless even this last proportion is still greater than that which the distillation of roses in Provence gives, for there it is stated to be necessary to employ sixty okes of roses to obtain one metical of essence. M. Dufour calls the attention of the French distillers to this point, considering that, taking good and bad years together, only 12 okes of roses are required to produce one metical of essence, bringing the production up 300,000 meticals. He describes the rose as bearing from 20 to 25 petals, of a brilliant hue and very bitter taste, which, when beaten with sugar, form a paste having the properties of scammony. The plant which produces this rose rises to about 1 metre or 1.30 metre in height, and flourishes vigorously in a clayey soil, which it is necessary to turn over four or five times a year. The quality of the roses, and consequently that of the essence, varies with the nature of the soil. The perfume differs according to the soil, as is proved by the fact that the agents readily distinguish the difference in the smell, and, what is more, the essence of one village freezes at 15 degrees of Réaumur, whilst that of another scarcely freezes at 5 degrees. Although the general production of roses during the last few years has tended to decrease, by reason of the low price, which has gone down from 1,250 fr. to 850 fr. the kilo., a price which gives a less profit than that afforded by the culture of cereals, yet the value of this material amounts annually to a million of francs at the least. There is also another species of rose cultivated in Turkey, from which the sweetmeats which ladies in the East offer to their visitors are prepared.

Colonies.

ON THE INFLUENCE OF MEGASS ON ANIMAL DECOMPOSITION.

By HENRY GIBBS DALTON, M.D., GEORGETOWN, DEMERARA.

I have noticed some particulars attending animal decomposition when subjected to the influence of megass, or the dried stem of the sugar cane after the saccharine juice has been crushed out by machinery. But before entering upon the circumstances which first led me to consider this subject, it may be as well to state that the sugar cane, which is sufficiently known to render any description of it quite unnecessary, after having been crushed by massive iron rollers worked by steam power, is stacked under large sheds open at the sides, but protected by slated or wooden roofs, where it is kept until sufficiently dried to be used as fuel for the boilers. When first stacked, it is known as green megass, being then in a more or less fresh state, and emits a powerful sweetish odour, and is evidently the resort of millions of small gnats and other minute insects, for towards morning and evening the Megass logies, as they are called, are surrounded by swarms of swallows and other birds which evidently come here to obtain a bountiful repast.

But in this raw or green state there exists another

striking and peculiar condition; there is an enormous amount of heat developed, causing the hands if thrust in to be quickly withdrawn, and a certain amount of steam or vapour is noticed. Both in this state and when more completely dessicated, megass is very combustible, and fires, spontaneous or accidental, frequently occur in these logies. It has often occurred to me to think that certain gases are generated during these changes, which probably tend to explain some of the peculiar facts about to be noticed.

On the 31st January, 1863, I was summoned to attend a coroner's inquest, and examine a dead body found in one of the megass logies on an estate on the west bank of the river Demerara. On approaching the spot where the corpse was stated to be, there was no fœtid odour as usual to indicate its presence, and on climbing up the dried megass, I saw the corpse of a human being partially embedded in megass, but without odour, and in a completely mummified condition. There was a fold of cloth twisted round the neck, and this joined another fold attached to a beam close by, leading one to suppose that death had occurred from strangulation. The body was completely dessicated, shrivelled and brittle, so much so that on trying to draw the corpse towards me by means of a pick for the purpose of examination, I was surprised to find the head separate completely from the trunk. On more closely examining the body the following facts were noticed:—

There was not the usual odour of a body long since lifeless, and exposed to the action of the air in a tropical climate.

The muscles, soft parts, and internal organs were shrivelled, dry and parchment-like in character.

The sex (male) barely distinguishable; the lower limbs were bent at an obtuse angle, and the skin and muscles clung round the bones like paper stretched over boards; the skull and face were denuded of all muscular and ligamentous traces, so that the disarticulation of the lower maxilla and cervical vertebræ was complete.

By the shaven crown and tuft of long hair, I recognised the body to be Chinese, and the only identity as to name, &c., arose from the peculiarities of the teeth, and from the absence of certain of them, which enabled some of the other Chinese immigrants to conclude that the deceased was one of their countrymen, who had been missing from the estates for several weeks.

This body, then, had been lying loosely covered with megass in the place where it was found for probably several weeks, during which time, although labourers were constantly in the neighbourhood, it had attracted no notice by any noxious effluvia, nor was it even spied out or scented by the carrion vultures (*Cathartes Jota*), who seldom fail to detect dead carcasses of any description, however obscured in the mud or the tangled bush of this colony.

Struck with so singular an appearance and condition, and with the remarkable absence of noxious smell, it seemed to me to be the result of some influence exercised by the megass on which the body had fallen or been thrown, and with a view to elucidate this, I instituted the following experiments:—

1st. On the 1st April, 1863, I buried a dead goat loosely in megass, and visited the spot on the 3rd, but could only detect a faint odour of decomposition, quite unlike the intolerable stench which is so common here in dead bodies exposed to the sun and air. On repeating my visit a few days afterwards, I found that the dead goat had disappeared, and on inquiry, found that it had been stolen by some Chinese who had speedily devoured it, so that it could not have been very offensive, for although our celestial immigrants are incorrigible thieves, and not very particular as to the quality and condition of their food, they would hardly have appropriated this first subject of my experiment had it not been more or less preserved by the agency of megass.

On the 27th of the same month I buried another dead goat in a similar manner, but somewhat more securely out

* A metical (called in Turkey "myscal") is about one drachm and a half.

of reach of the Chinese, and disinterred it about 30 days after, or on the 27th May. During that time I had repeatedly visited the neighbourhood, accompanied by others, and not one of us could detect the slightest offensive odour. On examining the body, which by-the-bye was completely disintegrated, there was no other trace of noxious effluvia than is peculiar to the dried skin of an animal. The head was denuded of all muscular and ligamentous attachments. The orbits were empty, and the bones forming it perfectly clean, likewise the nasal structure, palate, and jawbones. Several disarticulated vertebrae were found loose and totally void of muscles and ligaments, likewise the ribs and other parts of the body as far as they could be gathered; the outer casing of one horn was completely detached from its osseous support, and the rest of the carcase was in a fragmentary state, dry and scentless. There were no ants or other insects visible to account for this complete disintegration, but possibly whilst the noxious odour of decomposition was neutralised by the heat or gases developed by the megass, the work of destruction of the soft parts might have been carried on during the month of interment by ants and other insects, although no trace of them was visible at the time of my inspection.

Of the many practical advantages to which the discovery of the disinfecting properties of megass, if confirmed by further experience, might apply, I do not think I need offer any remarks at present, or until the subject has been more fully examined. I may mention, however, that an occasion lately presented itself by which I was enabled to test its value, and to prove its efficacy as a very useful agent in a sanitary point of view.

Shortly after my experiments on the properties of the megass, I was much concerned at the outbreak of a number of cases of sloughing ulcers on the feet and legs of the East Indian immigrants (Coolies and Chinese,) in one of the Estates' Hospitals under my medical charge, and my anxiety was still further increased on the appearance of hospital gangrene among some of the worst cases. Not only in the wards where the unfortunate patients slept, but throughout the whole hospital, the effluvia was most offensive and disagreeable. After making use of several medical disinfectants in vain, I determined to make a trial of the megass.

I desired several large baskets to be filled with it, and placed them in the corners of the wards by the doorways, and in the gallery to windward of the rooms, and on my next visit was agreeably surprised to find the obnoxious odours greatly lessened. I continued its use, and in a short time (two or three days) the change for the better was very remarkable. Except in the immediate neighbourhood of the worst cases, there was no unpleasant odour, and even then the disagreeable smell was greatly modified.

Unfortunately there was no corresponding improvement in the character of the sores decidedly attacked by gangrene, but the general improvement in the hospital was manifest, for not only was the unhealthy effluvia neutralised by the megass vapour, but the peculiar, pleasant, and sweet flavour of the cane, was disseminated through the whole hospital, rendering its atmosphere fresh and agreeable, so much so, that in spite of the disappearance of the gangrene, and the existence merely of ulcers of an ordinary kind, its use and benefit are still appreciated by the nurses and patients, who are assiduous in constantly keeping up a fresh supply.

In submitting these few remarks on a subject altogether new, I think I may venture to state that in green megass we possess an agent competent materially, if not entirely, to neutralise noxious gases, and thus by arresting or destroying the offensive odours of animal decomposition, and the foul air of hospitals, to prove of eminent service and benefit in a tropical country, where these unpleasant and injurious conditions are too apt to prevail.

Obituary.

WILLIAM MAKEPEACE THACKERAY.—On the night of the 24th of December this great artist, after a short illness, was found dead in his bed, in his house on Kensington-palace-green. He was the son of an officer in the East India Company's Civil Service, and was born at Calcutta in 1811. He was educated at the Charterhouse, and resided for some time at Cambridge as a member of the University. Thackeray became celebrated, wherever the English tongue is spoken, as a writer in the best style, but he had the genius in him which might have made him equally great as a painter. Indeed, his first serious commencement to earn his living, was in the practice of the fine arts and not of letters, and he retained the instinct for drawing all his life. He studied for a time in Rome and Paris. You felt that his sketches, although verging on caricatures, were full of genius. Like Blake's drawings, although altogether deficient in cultivation and art power, they were worth a great deal more than many works where the art was pre-eminent. The illustrations of his "Comic Tales and Sketches," published in 1841, "Vanity Fair," and "Pendennis," were drawn and etched by himself, but in the "Newcomes," and "Philip," and the "Virginians," he made simply the pencil sketches, and put the etching of the "Newcomes" into the hands of Richard Doyle, and "Philip," and the "Virginians" were consigned to Mr. Watson. The result was not a very happy one in the Doyle translations, and Thackeray's own work, with all its rawness and awkwardness, was preferable. The proprietors of *Punch* might make an interesting sheet or two out of the vignettes and initials which his fancy inserted in his "Snob Papers," &c. Before Ruskin had aroused public attention to art criticism, Thackeray was in the habit of contributing to *Fraser's Magazine* an annual criticism on the Royal Academy and the exhibitions of the season. He had a keen feeling for excellence in art. Leslie, for some qualities, and Mulready for others, were greatly appreciated by him. Many years ago he wrote an admirable article in the *Westminster Review* upon George Cruikshank, and Cruikshank's etchings for the *Comic Almanack* were usually accompanied with a tale by Thackeray. "Stubbs's Calendar, or the Fatal Boots," in 1839, and "Barber Cox, and the Cutting of his Comb," in 1840, were two of such tales. The causes of his death are accurately described in the *Times* of the 25th December. The accounts which have appeared in most other papers are erroneous. For many years past he was subjected to the most violent fits of retching, which occurred about every six weeks; they used to leave him so prostrated that he appeared almost lifeless afterwards. It was one of these attacks in its severest form, terminating with an effusion upon the brain, which caused his death. The *post-mortem* examination, which was conducted by his usual medical attendants, Mr. Haden and Mr. Traer, in concert with Mr. Henry Thompson, showed that besides the pressure on the brain the heart was overcharged with blood. The brain itself was found to weigh 58·5 ozs. Within the last three years Thackeray had invested a large portion of the fruits of his work—and very hard work too—in building a house on Palace-green, Kensington, somewhat in the style of Queen Anne's time, and he delighted himself in furnishing it with objects illustrating that period. It is a red brick house, very unlike a London mansion, immediately opposite the little gate entering Kensington Gardens. This, with the whole of his other property, devolves on his two daughters. He was buried at Kensal Green on Wednesday last. Only four of his relatives attended the funeral, which was of the simplest character, but a large concourse of his friends and admirers stood around his grave. His age was fifty-two years.

SAMUEL HALL, well-known in the manufacturing and engineering world for his numerous inventions, died on the 21st of November, 1863, at his residence Morgan-street, Tredegar-square, Bow-road, at the ad

vanced age of 82. He was the second son of Mr. Robert Hall, of Basford, near Nottingham, a cotton spinner and bleacher, still remembered there for his ingenuity and the singular beauty of his character. Robert Hall, as a cotton spinner, followed in the track of Arkwright and Peel, and as a bleacher he had the merit of first using chlorine, then called oxymuriatic acid gas, on a large scale, by which a result was accomplished in a few hours that had formerly required as many weeks to produce. He had great inventive talent, and was ever engaged in trying some new application of science to the improvement of manufactures. His neighbours designated the place where he first made his attempts to introduce the use of chlorine by the name of Bedlam, which it still retains. Berthollet had discovered that chlorine possessed the property of discharging all vegetable colours, and Mr. Hall corresponded with Dr. Priestley and Mr. Henry, of Manchester, on the probability of the successful application of this agent to the important art of bleaching. Dr. Priestley, in a letter to him, dated August 12, 1788, says:—

"Anything I know is at your service, but I really have nothing to communicate on the subject of bleaching by the dephlogisticated marine acid. I have indeed made the liquor in a small quantity for the purpose of taking spots out of linen, but I cannot think it will ever be so *cheap* a process as to serve for bleaching in large works."

He was at first discouraged from proceeding, but, recurring to the project, he experimented with the happiest results, and thus commenced a vast industry, the importance of which is described as follows by Baron Liebig (*Letters on Chemistry*, 3rd ed., p. 144):—"But for this new bleaching process, it would scarcely have been possible for the cotton manufacture of Great Britain to have attained its present enormous extent; it could not have competed in prices with France and Germany. In the old process of bleaching, every piece must be exposed to the air during several weeks in summer, and kept continually moist by manual labour. For this purpose, meadow land, eligibly situated, was essential. Now, a single establishment near Glasgow bleaches nearly 1,400 pieces daily throughout the year. What an enormous capital would be required to purchase land for this purpose! How greatly would it increase the cost of bleaching to pay interest on this capital, or to hire so much land in England! This expense would scarcely have been felt in Germany. Besides the diminished expense, the cotton stuffs bleached with chlorine suffer less in the hands of skilful workmen than those bleached in the sun." Mr. Hall was well versed in the chemistry of that day, as propounded by Black, Scheele, Lavoisier, and Berthollet, and was a constant reader of the well-known *Nicholson's Journal*, and the "*Annales de Chimie*." He was also well versed in mechanics, and, in 1794, received a prize of forty guineas from the Society of Arts for an improvement in cranes.* Mr. Hall's originality and powers of research were worthily perpetuated in his family. The fourth son, Dr. Marshall Hall, was known throughout the world, as a most distinguished physiologist and physician; and of the second son, Samuel, the subject of the present notice, it may be said that, in his genius for inventions, at once the result of science and source of improvements in British manufactures, and the extension of British commerce, he has rarely been excelled. To him Nottingham owes, in a great measure, its present commercial prosperity and importance, arising from his invention of the process of gassing lace and of the bleaching of starch, by which the Nottingham cotton fabrics are scarcely distinguishable from the linen thread lace of the Continent. Mr. Felkin, in a paper "On the History and present state of the Machine-wrought Lace Trade," read before this Society on the 28th of May, 1856, says:—

"It had been observed by Mr. Samuel Hall, of Basford, Notts., to whom not only this but other trades are deeply indebted for his scientific improvements, that both cotton yarns and fabrics, especially lace nets, were fibrous, and the interstices not clear.

He patented inventions for passing both thread and nets, or other substances, through gas or other flame, and thus singeing off the fibre without injury to the articles, thereby effecting a great improvement in them. Mr. Hall's improved starch is well known. He was the first, so far as I know, who availed himself of extended advertising to get an invention or article into demand. His specimens of gassed thread and lace fairly placed beside ungassed ones, will be remembered as being found in every number of several periodicals for years together. He effectually made Urlings (*i.e.* bobbin) net known far and wide."

The first idea of passing a piece of the finest lace over an actual flame of gas was a bold one, and presents an instance of the most original imagination; for it was difficult to suppose that the whole fabric would not be consumed. Sir Humphrey Davy had just presented his paper on flame to the Royal Society. Mr. S. Hall was well imbued with the chemical science of that day, and it was plain to him, that by merely passing the lace over a flame of gas, the loose fibres might be removed from the lace, whilst the lace itself would remain unharmed. His inventive genius further suggested that the flame might be drawn through the lace, and that the desired result would be accomplished by means of a vacuum above the lace. Perfect success followed the trial. The sheet of lace passed to the flame opaque and obscured by loose fibre, and issued from it bright and clear, and not to be distinguished from lace made of the purest linen thread. In 1827 the late Lord Tenterden sat as judge at the assizes at Nottingham, and having previously presided on the occasion of a trial relative to the patent for this invention, expressed a wish to see the process which had so deeply interested him, and he visited the works at Basford. The principle was also applied by the inventor to cotton yarn itself, muslin and calico. The influence of this improvement on the British commerce in cotton goods has been immense, and its benefits have been largely shared by Nottingham, Derby, Leicester, Manchester, and Glasgow. But Mr. Hall's labours did not end here. The lace manufacturers of Nottingham complained that though their lace was clear, and perfectly white when bleached, its colour was greatly injured by the starch with which it was afterwards "got up." Mr. S. Hall extended to starch the principles which his father had applied to the bleaching of fabrics, and by the use of chlorine gave the manufacturers a bleached starch which at once perfectly remedied the evil. Among Mr. S. Hall's numerous inventions, may be noticed one by which he long succeeded above all others in the cultivation of the vine. Formerly the branches only were exposed to warmth; the roots being left in the cold soil. It first occurred to Mr. Hall to heat the roots like the branches. Formerly, too, the air of the hot-house, whilst raised in temperature, became proportionately dry; he proposed to supply it with moisture as well as heat. Both these objects were accomplished by means of steam diffused in the air and in the soil. The wood and the fruit were equally improved by this simple means. These and other experiments were devised at Basford Hall, then his property, where he exercised a graceful hospitality still well remembered. A crowd of new and brilliant ideas, however, soon distracted his attention, and it is to be regretted that he could not confine himself to the profitable working out of one alone. He had also in after years to contend with much injustice in connection with his engineering patents, and thus experienced the too frequent fate of inventors, who, as is well known, are seldom enriched by their schemes. The era of railways and steam ships was now commencing, and Mr. S. Hall accordingly turned his energies in this direction, obtaining patents, among others, for Improvements in the Steam Engine, for Combustion of Smoke, for the Prevention of the Explosion of Steam Boilers, and for the Reefing and Unreefing of Paddle-wheels. His principal improvements in the steam engine consisted in a new mode of condensation of the

* See "Transactions of the Society of Arts," vol. xii., p. 283.

steam, by passing it through metallic pipes or channels surrounded with cold water. A saving of more than 20 per cent. in fuel and repairs was reported to the Admiralty as being thereby effected. This principle of surface condensation is now in general use, and to it a large share of the increased efficiency of our marine engines is due. The combustion of smoke was produced by arrangements for slowly and gradually feeding the fire with fuel, and for the admission of atmospheric air to the ascending gases and smoke. An apparatus on Hall's principle is said to be now in constant operation at the General Post-office, in London. The prevention of explosion in steam boilers is effected by arrangements for giving a constant rotary movement to the valves, so that they cannot become immoveable and "fast," and for supplying the constant waste of water in the boiler, so that it can never become empty, or nearly empty. Lastly, the reefing and unreefing of paddle-wheels were effected without stopping the engine, or vessel, by means at once simple and effective. On these and kindred subjects Mr. Samuel Hall laboured and thought with extraordinary enthusiasm and devoted constancy to the extreme close of his protracted life. He had in large measure the true genius of the mechanician, and belonged by nature to that illustrious race which has in all ages bequeathed a heritage of power, and to which the world looks for its most splendid triumphs. He had no sooner invented one thing than he turned his active mind to another, leaving it to others to reap the pecuniary benefit of his invention; he thus made many rich whilst he remained poor. He spent immense sums on his inventions and never saved money for himself.

JOHN HENRY GREEN, F.R.S., died at his residence, Hadley, near Barnet, on Sunday evening, the 13th Dec. He was an only child, of wealthy parents, and having received a liberal education, and studied for some time at Berlin, pursued his professional studies at St. Thomas's Hospital, under the auspices of his paternal uncle, Mr. Cline. He was admitted a member of the Royal College of Surgeons on the 1st of December, 1815, having for two years previously acted as demonstrator, the best proof of his proficiency as an anatomist, and so creditably were the duties attached to this office performed, that, in 1818, he joined Mr. (after Sir) Astley Cooper as joint lecturer on anatomy and physiology. In 1820 he succeeded the younger Cline as surgeon to St. Thomas's Hospital, and with Sir Astley Cooper delivered lectures on surgery and pathology. As an operative surgeon he was unequalled in the skill with which he performed the operation for lithotomy, having, in 1847, operated in forty cases, and lost only one. This unequalled success created a great sensation at the time. In 1830 he was appointed to the professorship of surgery in King's College, of which institution he was at the time of his death a member of council. In 1835, on the death of Mr. Lynn, surgeon to the Westminster Hospital, and a councillor of the college, Mr. Green was unanimously elected to the chair in the council of that college, of which he had become so bright a member. In 1840 he was deputed to deliver the annual oration in memory of John Hunter, which, at the earnest request of his colleagues, he afterwards published, under the title of "Vital Dynamics;" and again, in 1847, he became Hunterian orator, and published the lecture under the name of "Mental Dynamics." In 1846, on the resignation of Sir Benjamin Brodie, Bart., Mr. Green became a member of the Court of Examiners, an appointment he held up to the time of his decease, and in 1849 obtained at the hands of his colleagues the highest appointment they had it in their power to confer—viz., the president's chair, an honour again conferred on him in 1858. From her Majesty's Government he received the appointment of President of the Council of Medical Education and Registration of the United Kingdom. The death of Mr. Green, though at last sudden, was not altogether unexpected;

he had been labouring for some months under a sharp attack of gout, complicated with disease of the heart, from which it was hoped, by the kind skilful treatment of Mr. Brinton, his attached friend and physician, he had recovered.

Publications Issued.

WEDGWOOD: AN ADDRESS, by the Right Hon. W. E. Gladstone, M.P., Chancellor of the Exchequer.—(*Murray.*) This is a reprint of the address delivered at the laying of the first stone of the Wedgwood Institute, at Burslem, October 26th, 1863.

A LIST OF THE CUSTOMS PORTS AND INLAND BONDING TOWNS OF THE UNITED KINGDOM, by James Donelan, Collector of Customs at Exeter. (*Efingham Wilson.*) In this work the tables are arranged under the separate scale of salaries apportioned to the collectors by the recent revision of the establishments for the year ending the 31st December, 1862. They exhibit at one view numerous particulars of the trade, revenue, and establishments of each port, including the population in 1861; salaries of collectors in 1859 and 1862; total receipt of duties; number and tonnage of vessels, inwards and outwards, with cargoes; number and tonnage of vessels registered, belonging to each port, &c.

QUEENSLAND, CONSIDERED AS THE FIELD FOR BRITISH LABOUR AND ENTERPRIZE, AND THE SOURCE OF ENGLAND'S COTTON SUPPLY, by George Wright. (*Street, Cornhill.*) The author, who was two years and a half resident in the colony, has just brought out a third edition of this work. He states that his aim has been to produce a work, cheap and practical, containing as much of detail as may enable a sensible man, should he emigrate to Queensland, to work his way there with a fair prospect of success; and he says that he feels persuaded that the industrious man who may be induced by its statements to emigrate to that colony will never regret that he has done so.

THE ENGINEER'S, MANUFACTURER'S, AND MINER'S VADE-MECUM, by Dr. K. P. Ter Reehorst (*Cowper's-court, Cornhill.*), presents, on a single sheet, a list, in five languages, of technical words not usually to be found in dictionaries.

A NEW MAP OF THE BRITISH ISLES; suitable for Halls, Offices, Libraries, &c.—(*William Westley, Paternoster-row.*) Price 30s. mounted on roller or folded in case. The size is 5ft. 6in. by 4ft. 10in.—This map shows all the towns and principal villages, and all the railways to the present date. It is printed from steel plates, and has been revised by the conductor of the Government Maps.

Forthcoming Publications.

A HISTORY OF THE WORLD FROM THE EARLIEST RECORDS TO THE PRESENT TIME. By Philip Smith, B.A. (*Walton and Maberly.*) This work is by one of the principal contributors to the dictionaries of Greek and Roman antiquities, biography, and geography, and is an attempt to trace the story of Divine Providence and human progress in one connected narrative. It is proposed to condense it sufficiently to keep it within a reasonable size, but yet free from the baldness of an epitome. It is intended to follow the story of our whole race, from its beginning in the sacred records, and from the dawn of civilisation in the East,—through the successive Oriental Empires,—the rise of liberty and the perfection of heathen polity, arts, and literature in Greece and Rome,—the change which passed over the face of the world when Christianity sprung up,—the origin and first appearance of those barbarian races which overthrew both divisions of the Roman Empire,—the annals of the States which rose on the Empire's ruins, including the picturesque details of

medieval history and the steady progress of modern liberty and civilisation,—and the extension of these influences, by discovery, conquest, colonisation, and missions, to the remotest regions of the earth. The more striking facts of history,—the rise and fall of empires,—the achievements of warriors and heroes,—the struggles of peoples for their rights and freedom,—the conflict between priestcraft and religious liberty, will occupy a prominent place, but they will not divert attention from the more quiet and influential working of science and art, social progress and individual thought. The work will be divided into three periods, each complete in itself, and will form eight volumes in demy octavo. 1. Ancient History, sacred and secular; from the creation to the fall of the Western Empire, in A.D. 476. Two volumes. 2. Medieval History, civil and ecclesiastical; from the fall of the Western Empire to the taking of Constantinople by the Turks, in A.D. 1453. Two volumes. 3. Modern History; from the fall of the Byzantine Empire to our own times. Four volumes. It will be published in monthly parts at 2s.; and half-yearly volumes at 12s. 6d.; cloth lettered. The first part appeared in November.

THE STANDARD GUIDE TO POSTAGE STAMP COLLECTING, with their Values and Degrees of Rarity. (*Hotten, Piccadilly.*) This work, it is said, has occupied the authors, Messrs. Bellars and Davie, for three years. It includes an account of the Mormon stamp issued by Brigham Young in 1852.

Notes.

METROPOLITAN FIRE BRIGADE BILL.—On the 15th December, a special meeting of the Vestry of Marylebone took place, to consider a proposal for the introduction of a Bill by the Government to take the fire brigade out of the hands of the insurance companies, and by means of a tax upon the ratepayers of the metropolis for its support, place the control in the hands of the Metropolitan Board of Works.

THE PROFITS ON GAS.—By a parliamentary return it appears that the Metropolitan Gas Companies paid dividends in 1862 as follows:—the Chartered paid dividends at the rate of 9 and 10 per cent., including back dividends at 1 per cent., per annum for the half-year to Christmas, 1856; the City of London dividends at 9 and 4 per cent., with a balance of £658; the Commercial, £30,513 on a capital stock of £322,195 (less sums remaining outstanding). The Equitable paid dividends at the rate of 11, 14, 14, and 10 per cent. (less sums remaining outstanding), with a balance of £396; the Great Central dividends at the rate of 6 and 8 per cent. (less sums remaining outstanding), with a balance of £18,445; the Imperial at the rate of 10 per cent., with a balance of £58,500; the Independent at the rate of 10 per cent., with one year's back dividend (£1,500), and a balance of £3,548. The London paid £36,827 on £548,843 (less sums remaining outstanding). The Phoenix paid 10 per cent., with £8,190 dividend arrears for 1856, with a balance of £930. The Ratcliffe dividend was £3 15s. per cent., without a balance; the South Metropolitan, 10 per cent., with a balance of £10,369; the Surrey Consumers', 10 per cent., with a balance of £4,047; and the Western, 10 per cent., with £5,285, "towards back dividends of less than 10 per cent."

PATTERN POST TO CANADA.—The Postmaster-General has issued an order, to take effect on and after the 1st instant:—Patterns of merchandise, similar to those already transmissible by post between any places in the United Kingdom at reduced rates, may be transmitted by post between England and Canada, by Canadian mail packet, at the following rates of postage, which must in all cases be prepaid by means of postage stamps, viz.:—4oz. 3d., under ½ lb. 6d., under 1 lb. 1s., under 1½ lb. 1s. 6d., under 2lb. 2s., every additional ½ lb. 6d. No

packet of patterns must exceed two feet in length, breadth, or width; exceeding those dimensions it cannot be forwarded through the post. The patterns must not be of intrinsic value. There must be no writing or printing other than the address of the person for whom the packet is intended, the address of the sender, a trade-mark and numbers, and the prices of the article. The patterns must be sent in covers open at the ends, so as to be easy of examination. Samples, however, of seeds, drugs, and so forth, which cannot be sent in open covers, may be enclosed in bags of linen or other material tied at the neck; bags so closed that they cannot be readily opened, even although they be transparent, must not be used for this purpose.

IRON CLAD SHIPS.—A correspondent of the *Standard* writes:—To whom should be accorded the merit of the first discovery of the use of iron-plating as a protection to ships of war, has been a matter of no little controversy. As none, however, pretend to lay claim to the invention at a date anterior to the present century, there seems scarcely a doubt that all claims must be waived in favour of the Japanese. In 1613 William Adams, in a letter from Japan, dated December of that year, in a mention of his voyage from Firando to Oösaka through the Inland Sea by the Strait of Simonoseki, writes thus:—"We were two daies rowing from Firando to Faccate. About eight or tenne leagues on this side the straights of Xeminaseque we found a great towne, where there lay in a docke a juncke eight hundred or a thousand tunnes burthen, sheathed all with yron, with a guard appointed to keep her from firing and treachery. She was built in a very homely fashion, much like that which describeth Noah's arke unto us. The naturals told us that she served to transport soulders to any of the islands if rebellion or warre should happen." So even the latest "reconstruction" in "wood and iron" is 250 years old. The locality is easily traced on the map. Fakata is in the bay of Hakosaki, a spacious harbour midway between Firando and Simonoseki, the distance given being almost exact; and the great town is doubtless Fukuoka, the capital and fortress of the Prince of Mino, on the shores of the same bay.

THE WHITWORTH INSTITUTE.—This Institute, erected at Fleetwood, by the munificence of Benjamin Whitworth, Esq., at a cost of £2,000, was opened on the 15th December, by a tea and public meeting, presided over by J. A. Turner, Esq. The Rev. R. S. Stoney bore testimony to the noble example of Mr. Whitworth, to whom an address was presented from the inhabitants of the town. Mr. Whitworth, in his reply, remarked that, whilst acknowledging the warmth of the reception given him, he only felt the erection of the Institute a matter of duty.

INDUSTRIAL EXHIBITION.—The officers and men of the second battalion of the 12th Regiment have resolved to open to the public, on the 12th January, an industrial exhibition, in Dublin, where they propose to display such specimens of their handicraft and ability as their several tastes and previous avocations may suggest. An opening march, composed in the regiment, will be performed by its band at the opening of the exhibition. There is a photographic school attached to the battalion, and some specimens of this art will be shown. All the printing required for the exhibition will be executed by soldiers, at their own printing press. The articles exhibited will be sold, and the proceeds devoted to the regimental charitable funds.

SOUTH KENSINGTON MUSEUM.—The number of visitors on Saturday, 26th December (Boxing-day), was 8,382, of which 2,463 visited the new National Art-training Schools. The visitors on 26th December, 1862, were 5,962.

THE CRYSTAL PALACE ON BOXING-DAY.—The following totals are the numbers of visitors on each Boxing-day since the opening of the Palace:—1854, 10,935 visitors; 1855, 3,347; 1856, 5,645; 1857, 16,350; 1858, 26,398; 1859, 34,564; 1860, 23,267; 1861, 39,099; 1862, 33,315; 1863, 43,741.

A SUBMARINE SHIP.—Mr. Geo. Cheek, of the *Cambria Daily Leader*, writing to the *Times*, says—"I have had my attention called to an article which appeared about three weeks ago in reference to the Russian Government, who you state are now building a submarine ship, which is made to float beneath the water, and to rise and sink when required. It is to be worked by a compressed-air engine, and is fitted with apparatus for fixing torpedoes on the bottom of ships it proposes to sink. No doubt many of your readers will recollect having seen plans of such a ship, which I exhibited at the Society of Arts, 1858, and of the compressed-air engine, a small model of which I have made, from which model I demonstrated that I could obtain as great a pressure by air as by steam. I wrote to the Admiralty, and submitted my plans to them, which were returned about three months after by Sir Baldwin Walker, who stated that the Lords of the Admiralty were not then in a position to undertake them. I have not since then adopted any further steps to get the matter taken up, but, no doubt, the Russian Government, who are more in the habit of encouraging invention than our own, have taken copies of my plans, and are now working them out with the greatest secrecy. I may add one advantage which my submarine ship has over that which the Russian Government is building,—it is provided with a round house (or cupola) on deck, from which, when the vessel is raised to the level of the water, observations can be made of surrounding objects and country."

WATER MILLS AT ARGOSTOLI.—Professor Ansted, in his work on "The Ionian Islands," says:—"A curious natural phenomenon occurs, and is taken advantage of, in the neighbourhood of Argostoli. At four points on the coast, the sea, at its ordinary level, enters a very narrow creek, or broken rocky channel, and after running somewhat rapidly through this channel and among broken fragments of rock for some distance, it gradually becomes sucked into the earth and disappears. By conducting the water through an artificial canal for a few yards, and so regulating its course, and forcing all the water that enters to pass in a single stream beneath an undershot wheel, power enough is obtained in two cases to drive a mill. Mills have, in fact, been placed there by an enterprising Englishman, and are constantly at work. The stream, after being utilised, is allowed to take to its natural channel, and is lost among the rocks. It is common enough to drive a wheel by a current of water going from the land towards the sea, but it is certainly rare, and, as far as I am aware, peculiar to the locality, to find mills driven by a current of sea-water, acting quite independently of tide, the water constantly and steadily rushing in over the earth's surface, and finally disappearing. It is not the river god pursuing the nymph, but the great Neptune himself invading the domain. It is indeed no wonder that the Cephalonians are proud of their mystery."

FORGING NOTES BY PHOTOGRAPHY.—A prisoner having been convicted of forging Austrian bank notes by means of photography, a question was raised whether this amounted to an engraving of the notes in question, according to the terms of the statute. The judges considered the legal question that was submitted to them, and were unanimously of opinion that the prisoner had been properly convicted, and the sentence adjudged was penal servitude for six years.

FEES ON RAILWAY BILLS.—There have been 304 railway schemes deposited. The fee on a deposit at the Private Bill Office of every document is £5, and £5 a day to the examiners to ascertain whether there has been a compliance with the standing orders. On each reading there is a fee of £15, and a similar fee on the report. Among the reforms recommended by the late select committee on the subject, the fees of the House and of counsel were declared to be too high. The forthcoming session is expected to be the busiest one since the year 1845, when railway projects were very numerous.

Correspondence.

SUPPLY OF FLAX.

SIR,—In the *Journal of the Society of Arts* of the 14th August last there are some interesting and important remarks by Mr. Baker, Inspector of Factories, on the decreased supply of flax. We have drifted into a cotton famine, and there is every appearance of a flax famine. For some years past persons have been satisfied with the old saying, "As is the demand so will be the supply;" but has not this supposed truism been exploded in the case of cotton? and I think I shall be able to show the same result as to the supply of hemp and flax.

Mr. Baker very justly observes, with regard to flax, if there should be a flax famine, as there has been a cotton famine, we should again suffer extremely, with the consciousness that by a little forethought those sufferings might have been alleviated if not averted.

Now the most important question is, whose business is it to look into these things, and provide against such contingencies? We write and talk about it, and there the matter ends.

The same gentleman remarks, "a company was started in Yorkshire, for the purpose of collecting flax in this country from the farmers, and preparing it for the trade; but the company has broken up for want of encouragement, even from the trade itself. No doubt our large flax spinners are quite satisfied with the great profits they are making through their agents and buyers in Russia and various parts of the continent."

Mr. Baker attributes the short supply of flax to its decreasing growth everywhere whence we have hitherto been supplied; this, I think, is a mistake. My firm conviction, from actual experience acquired in a visit I made some years since to Russia, is, that the Russians and other continental people are gradually working up their raw material of flax and hemp themselves; they are doing so with their wool, and are great competitors with us at our wool sales.

The quantity of first-class flax spinning machinery exported to the continent, particularly to Russia, of late years has been enormous, and some of our most talented men have been engaged as managers. I have heard some of our largest machine makers remark that, had it not been for the continental demand, at times they would have had scarcely anything to do. The Russians now have nearly a monopoly of the export trade of ships' cordage. Take up any of the colonial papers, and you find the Russian article quoted at £5 per ton advance on English rope. For this they have to thank English talent and machinery, having the raw material at home with cheap labour.

If anything, the growth of flax has rather increased in this country, more particularly in Norfolk and Suffolk, in which neighbourhood there is a flax rettery, conducted on the most scientific principles. I know of one farmer in that district who sold 5 acres of flax, as it stood on the ground, for £100. The cultivation of flax is increasing in Somersetshire; in fact, it has always been extensively grown there for the local manufacture of their celebrated east and west coker canvas, which has a world-wide reputation. A flax market has been held in Yeovil, Somerset, for many years; and landlords, instead of obstructing the growth of flax, actually give prizes for the best samples. It is found that when the seed is saved by the new method of pulling the flax just previous to its being ripe, allowing it to ripen on the ground, the fibre is equally good, and that from 18 to 24 bushels of seed to the acre is saved for cattle feeding; by this means, it is said, more is returned to the land than is taken out of it.

It was no uncommon thing in the West of England, many years ago, in war time, in a good season, for the farmer to be enabled to purchase the freehold of the land with one crop of flax. In many parts of England the art of cultivating and preparing flax is

entirely lost, when some sixty years ago every villager in England must have well understood it, having to supply the local demand of the domestic spinning-wheel, which has gradually been superseded by machinery. This local demand fell off, and this, joined with the great prejudice of landlords in former times against the growth of flax, caused the extinction of its cultivation in many districts. It was formerly considered a very exhausting crop, the seed at that time not being saved, but put into steep with the flax; but, whatever quantity might be grown in this country, the demand would be greater than the supply for the requirements of our extensive trade. I may observe that the increased growth of flax in Ireland this season has been 60,000 acres.

Several letters have, at various times, appeared in the *Times*, calling attention to the flax, or as it would be more properly termed, the hemp of New Zealand, more particularly a recent letter, signed "Phormium Tenax," where the writer says:—"It is found in almost every district, to such an extent that thousands upon thousands of acres of the most beautiful fibre rots on the ground, for want of cutting and gathering, which, if brought to this country, would give unlimited employment to the labouring population." These letters, from non-practical men, may amuse the general public, but with the manufacturer they only raise a smile.

The native-prepared fibre might be spun into yarn, for fine canvas and sheeting, but the quantity a native can do in a day is very small, not more than 12 to 14 lbs., he only using one side of the leaf, and throwing the rest away. Since the place has been colonised, native labour is much more valuable in other ways, so that very little fibre is thus prepared by them now.

Some enterprising settlers are experimenting on the whole leaf, and are tolerably successful, as in this way fibre can be produced in large quantities, but it is of the coarsest kind, something between Russia and Manila hemp, and will never be adapted for other than rope-making purposes, which it is well suited for, both on account of its strength and also (if tarred) for its durability. A friend of mine, in Nelson, New Zealand, a great enthusiast as to the value and importance of this fibre, consigned to me about 3½ tons, three years ago. To test its real value I put into the hands of a first-class broker; it was put up with other fibres to public auction, and only realised £16 per ton. If it had any pretensions to be regarded as flax, it would have been worth three times that sum; but, to do New Zealand flax justice, I must also state that, like most colonial attempts in that way, it was badly prepared, and put loose into the hold of the vessel, like dunnage. Had it been well prepared and packed, it would have realised from £30 to £35 per ton, for rope-making purposes. My friend paid £20 per ton for it, cash on the spot; it cost £4 14s. shipping and other charges there; freight, insurance, dock, and other charges here, £21 7s. 3d. making in all £26 1s. 3d. for 3½ tons; so there was a clear loss to my friend of £45 18s. 10d. on that trifling quantity. The price realised at these sales is a good approximate criterion as to the real value of things.

We have also that valuable plant, the *Rhea*, a fibre of India, a most interesting plant; but at present, owing to the tedious native method of preparing it, it is far too costly for general use. The late Dr. Royle was of opinion that, if proper machinery could be invented for the purpose, it could be introduced at a less price than jute. Such a machine, I am convinced, could easily be invented, that would prepare, with one person, more in one day than can be prepared by the present mode in three or four weeks. But this would require a visit to India to try it in its green state.

In the *Journal of the Society of Arts*, of September 14th last, there is a most important and valuable communication on the subject of the cultivation of flax in South Australia, by Mr. MacCalman, to the Commissioner of Public Works, South Australia, where he remarks that

hundreds of thousands of acres of wild flax grow along the banks of the rivers and on the immense alluvial flats and swamps. This quite confirms the views that I have for some years formed as to the practicability of flax being profitably grown in certain parts of Australia. A friend of mine, many years a resident in Australia, well versed in colonial affairs, gave me a great deal of information on the subject of climate, soil, the rainy season, &c., and from what I learnt, I felt convinced that that colony was well adapted for the growth of flax, for as it only occupies the land rather more than three months, and requires much moisture, the periodical rains would last long enough to bring it to perfection; and the dry, hot summer being well adapted for steeping and drying it, it could be got out of the steep vat in the morning, and be dry and crisp, ready for scutching, in the evening. This process in England, in a dripping summer, is very expensive and tedious, the flax being out sometimes for weeks, and requiring constant attention to turn it to keep it from rotting.

Having had some experience in steeping and preparing flax with all the newest improved machines for scutching, and having visited various retortories in England, Scotland, and Ireland, I prepared a paper for my friend, to get published in one of the leading Australian papers, but this was not done, as many persons considered the climate too dry for flax.

The latest accounts from South Australia state that wheat is quoted at 5s. per bushel, and twenty bushels to the acre. It is sometimes as low as 3s. 6d., but at 5s. per bushel an acre of land only produces £10, with every expense to be paid out of it; whilst if grown with flax, with only an average crop of two tons of flax straw and 18 bushels of seed to the acre, the crop when prepared would be worth £25, and the cost of cultivation would be little more than wheat. I could give you the items, from actual experience, but it would take up too much of your valuable space.

Some years ago I was in the habit of attending most of the public sales of hemp and flax. I remember several bales of steeped flax straw, about two tons weight, from Australia, put up to public sale. It was beautifully pressed and packed in sheets, and was sold for £6 per ton, less than the cost of freight and charges. Had this been properly scutched, there would only have been about 7 cwt. of flax to pay freight and charges on, all the rest being waste. This would have been worth £60 per ton, or about £21 for the 7 cwt. The freight and charges on this would have been not much more than £2, and two men or stout lads, with 2-horse power and a modern scutching machine, would have prepared it in four or five days. There is no doubt that we could get a supply of hemp and flax from our various colonies, but there is much ignorance as to the mode of preparing and packing fibres, which the above case is only one instance of, and yet there is no want of zeal on the subject.

If we reason from analogy, from the results of the introduction of woollen machinery on the continent, we may safely come to some conclusions as to the possibility of the inhabitants working up their flax. In the early part of the present century we were dependent principally for a supply of wool on Spain; after the peace of 1815 supplies came in from Germany; the quantity from the latter source rose, in 1836, to nearly 32,000,000 lbs., but it has since rapidly diminished. In 1818 only a few tons of wool came in from Australia, and this has now risen to more than 25,000 tons, besides other colonies we get supplies from. I believe the Act of Parliament for preventing the export of spinning machinery was only repealed some time between 1840 and 1850; large quantities of spinning machinery were exported long before that time, in spite of constant seizures by the customs, and since then all the above quantities of flax that we formerly imported from the continent are now worked up there, and, as I before observed, foreigners are buyers of Australian wool in our market to the extent of many thousand bales a year; so where would our extensive woollen trade be had we

not this large supply from our colonies? There is not the least doubt that in the course of a few years, the same results will follow as regards their flax; and it would not be very unsafe to predict, that, judging from the above experience, if we could establish a good system of cultivating flax in Australia, so as to get a supply from thence in proportion to the supply of wool, our continental neighbours would be coming here as purchasers of flax. As I once observed in a former communication, above alluded to, in a great maritime country like Great Britain, where our very existence depends on our supremacy at sea, and with our vast fleets of mercantile and war shipping, none of which, either steam or sailing, can put to sea without rope, lines, and canvas, is it wise, is it prudent, is it consistent with common sense, that we should be mainly dependent on one country for such an important staple as hemp and flax, and that country of such warlike tendencies? When there is only a rumour of war with Russia, it runs up the price of those commodities very much, as was the case in the last war with Russia, when many previously well-to-do manufacturers were ruined through it. This question is one that intimately concerns everyone, from government, who require supplies of cordage, &c., to the lowest individual; but it is difficult to move in it; government will not, and what private individual can do so?

I should say it is a subject eminently adapted for the serious consideration of the Society of Arts, for if by any means this Society could promote the discovery of fresh sources of supply, the country and government would owe it an everlasting debt of gratitude. The Society has many members who are practical manufacturers, and others who have given great attention to a supply of fibres from new sources, some of whom could afford valuable information on the failure of the supply of flax from the colonies, from the utter ignorance displayed in its preparation for the market. There never was a time when flax could be more profitably cultivated in this country and the colonies than at present, not only from the great demand, but the great improvement made also in the last few years in machinery for flax scutching, which was once a most injurious and unpleasant employment, from the workmen being in a complete fog, as it were, of fine dust. Machines of the most simple kind can now be so arranged, that operatives can be comparatively free from dust, and the quantity scutched would afford the high price of labour in the colonies. Many English farmers, from the low price of wheat for the last few years, have seriously thought of converting their land for grazing purposes, but the cultivation of flax would pay them much better, and afford increased cattle-feeding powers. I know several farmers who have cultivated flax for years, for the sake of the seed for feeding stock, and for some time the straw was allowed to rot as manure, but it is now turned to account. This plan is far more profitable than buying foreign oil cake; one peck of crushed seed, boiled in twenty gallons of water, being sufficient for twenty bushels of chaff. I should suppose it would be equally valuable for stock, in the dry hot months, in Australia.

To the farmer of small capital the cultivation of flax would be a great assistance, as it can be got off the land about the middle of July, and the straw sold to a rectory, it would put him in cash to pay his harvest hands, and, with a good dressing of manure, there would be time to get in a crop of turnips afterwards.

With good farm buildings, a capital of from £400 to £500, judiciously laid out, would purchase an 8-horse engine, shafting, and scutching machinery, to produce four tons of long flax per week, allowing eleven to twelve tons of straw to two tons of flax, besides a large quantity of tow, which would more than pay for scutching. But with a steam-engine, or water power on the premises, £150 would be sufficient, or a much less sum, if for scutching the produce of one farm only.

Nothing would advance the growth of flax in this country and the colonies more than for three or four good lec-

turers to visit our agricultural districts, where the subject is not understood, and give lectures, illustrated with models of the best scutching machinery; affording advice, where needed, on steeping, the best arrangement of vats, sorting, packing, &c. I think it more necessary for the colonies, as they have not the advantage of knowing what improvements are taking place.

If such a movement were supported by the government, and they only saved one-half per cent. on their purchase of hemp and flax, it would pay for several lecturers. The extra cost of this material to this country during the Crimean war must have been some millions. Our colonists would take nearly all out in British manufactured goods, while the Russians take as little as possible. Thinking this important subject well worth the serious consideration of the members of the Society of Arts, I leave it in their hands, wishing a more able advocate had undertaken it.

I am, &c.,

EDWIN WARD TRENT.

Brooksbys'-walk, Homerton.

LUCIFER MATCHES.—SIR,—Having read the account of Mr. F. A. Abel's experiments at Woolwich on various descriptions of lucifer matches and his report on their comparative safety, it has recalled to my memory a description of lucifer which was introduced to the public, through the Society of Arts, many years since, by, I believe, a Mr. Barker.* I am under the impression that the Society awarded a medal to that gentleman for his invention, but that the Society's records will doubtless show. The object of Mr. C. Barker's invention was to give increased safety in the use of the lucifer, then a new invention, and also to make it available in climates and atmospheres which, either from excessive humidity or high temperature, rendered the ordinary match either useless or highly dangerous. As I do not remember to have seen any published account of Mr. Barker's match, and doubt if Mr. Abel had any to examine, I may perhaps be excused if I ask for so much space in your *Journal* as will admit of my attempting to describe it. The existing matches are, I believe, largely deteriorated in damp atmospheres by their ready absorption of moisture. Many readily explode with a sharp blow, and by much the larger proportion ignite at a comparatively low temperature. Mr. Barker overcame all such objections by merely making his matches with the phosphorus under the brimstone instead of over it. By so doing he coated the explosive and absorbent compound with a non-explosive and non-absorbent body. This he was enabled to do by first dipping his match in the explosive compound, and having dried it he then dipped it again in the liquid sulphur, and before the atmosphere had time to act through the coating it was plunged into a water-bath, which cooled and hardened it. The match was ignited by simple friction upon a piece of glass paper, which rasped off the sulphur and exploded the phosphorus in the usual manner. These matches I remember to have seen at railway stations and other public places at the time they were brought out, some twenty years ago, and I believe that the reason they failed to command the market was that they appeared to be merely an altered form of the old brimstone match, which had then scarcely gone out of use. I remember the above facts relative to Mr. Barker's match having used them at the time of their introduction, and I have frequently regretted my inability to obtain them, as I live in a somewhat damp locality, and have not unfrequently found the ordinary matches useless, while those I have attempted to call attention to I have placed in water (of course not above the sulphur), and after considerable immersion they ignited readily. The price was the same as the ordinary matches. I need scarcely add that a blow would not explode them, unless the sulphur was first broken off; and it required a high

* Mr. C. M. Barker's invention was brought before the Society in 1845, and was recommended by the committee as deserving of notice and the thanks of the Society.—ED. J. S. A

temperature (nearly 300°) to ignite the sulphur. If carefully packed for exportation they were also comparatively safe on board ship.—H. G. H.

MEETINGS FOR THE ENSUING WEEK.

- MON. ...Entomological, 7.
British Architects, 8.
Medical, 8½. Mr. F. W. Mackenzie, "Retroflexion of the Gravid Uterus, with especial reference to its Occurrence in the latter months of Pregnancy."
- TUES. ...Royal Inst., 3. Prof. Tyndall, F.R.S., "On Electricity at Rest and Electricity in Motion." (*Juvenile Lectures.*)
Pathological, 8. Annual Meeting.
Photographic, 8.
Anthropological, 4. Annual Meeting.
- WED. ... Geological, 8.
Pharmaceutical, 8. 1. Mr. John Elliot Howard, "Note on the Root-Bark of Calisaya." 2. Mr. Daniel Hanbury, "Note on *Cassia moschata*." 3. Mr. David S. Kemp, "On Goa Powder." 4. Mr. T. B. Groves, "Note on the Recovery of Essential Oils from their Watery Solution." R. Society of Literature, 8½.
- THUR. ... Royal, 8½.
R. Society Club, 6.
Royal Inst., 3. Prof. Tyndall, F.R.S., "On Electricity at Rest and Electricity in Motion." (*Juvenile Lectures.*)
- FRI.....Astronomical, 8.
Archæological Inst., 4.

Patents.

From Commissioners of Patents Journal, December 22nd.

INVENTION WITH COMPLETE SPECIFICATION FILED.

Cylinders of steam engines in the form of a segment of a cylindrical ring, and machine for boring them truly cylindrical, &c.—3103—W. H. Cole.

PATENTS SEALED.

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| 1578. W. W. Sleight. | 1604. H. G. Craig. |
| 1581. R. A. Brooman. | 1606. A. Watson. |
| 1590. T. Redwood. | 1610. G. Boccus. |
| 1591. P. R. Hodge. | 1615. G. Clark. |
| 1595. T. Skinner. | 1618. J. Chatterton. |
| 1600. T. Page. | 1620. W. Andrews. |
| 1601. J. O. Mathieu. | 1621. C. Avery. |

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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| 3085. G. Davies. | 3039. A. Verwey. |
| 3086. G. Davies. | 3101. T. W. Walker. |
| 3088. A. Kinder. | 3128. T. and B. C. Sykes. |
| 3092. N. C. Szerelmey. | 3146. E. Cook and J. Stokes. |
| 3194. T. Gibson and W. and H. Knighton. | 3132. G. B. Rennie. |

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

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| 2993. G. M. P. Swift, Viscount Carlingford. | 3003. J. Brown. |
| 3002. C. Fay. | 3015. T. White. |

From Commissioners of Patents Journal, December 25th.

GRANTS OF PROVISIONAL PROTECTION.

Aniline black, production of—3045—E. J. Hughes.
Bonnet front machines—3127—H. Kinsey.
Bricks, tiles, etc., drying—2526—H. Clayton.
Calendering machines—3153—W. Spence.
Cannon—3179—T. A. Blakely.
Cocoa-nut fibre—3125—E. Shepherd.
Cotton, carding—3139—B. Dobson, J. Hodgkinson, D. Greenhalgh, and F. Hamilton.
Draught-horses, lifting—3061—F. J. Walthew.
Fibrous materials 3137—J. Townsend.
Fire-arms, breech-loading—3159—T. Wilson.
Fire-arms, breech-loading—3171—J. Smith.
Fire-bars for locomotive engines—3165—W. W. Box.
Glass, grinding and polishing—3167—J. H. Johnson.
Heating, etc.—3055—S. A. and C. F. Varley.
Horse shoes—3041—J. Green.
India-rubber, dissolving—3183—C. Humfrey.

India-rubber soles for boots—3141—J. H. Johnson.
Looms—3175—J. Hindle, W. F. Calvert, and E. Thornton.
Oyster spawn and brood, cultivation of—2930—H. Ayckbourn.
Port closers for vessels of war, etc.—3115—W. Clark.
Puddling iron and steel—3093—T. Harrison.
Railways, shifting the points on—3135—W. T. C. Pratt.
Rice, machinery for cleansing—3161—H. B. Sears.
Roller for window blinds—3119—S. Tuchet.
Sash or shutter fastener—3117—R. W. Pyne.
Ships, steering gear for—3073—G. R. Tilling and J. Park.
Steam boilers, preventing explosion of—3111—H. Turner.
Sugar, extracting the syrups from—3123—J. Corby.
Sewing machinery—3181—A. V. Newton.
Transmitting motive power—3129—J. Cliff.
Washing machinery—3147—G. T. Bousfield.
Watches—3177—J. Gouvernon.
Wringing machines—3049—W. Williamson.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

Ink—3204—E. T. Hughes.
Socks—3198—H. A. Bonneville.

From Commissioners of Patents Journal, December 29th.

PATENTS SEALED.

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| 1625. J. G. Jennings and M. L. J. Lavater. | 1720. A. R. Johnston. |
| 1628. A. K. Richards. | 1723. C. de Bergue. |
| 1629. C. H. Gardner. | 1733. E. D. Chattaway. |
| 1631. S. Cole. | 1739. H. Greaves. |
| 1633. J. Blake. | 1761. P. C. A. Jodocus. |
| 1636. T. Boyle. | 1762. H. A. Bonneville. |
| 1637. C. P. Coles. | 1789. B. Lambert. |
| 1640. J. and J. S. Harvey. | 1808. W. Simpson & J. Hutton. |
| 1641. T. Taylor. | 1815. A. A. Pelaz. |
| 1644. J. Cole and J. Cole, jun. | 1820. F. L. H. Danchell. |
| 1645. J. J. Shedlock. | 1832. P. R. Jackson. |
| 1646. R. A. Brooman. | 1888. W. and S. Firth. |
| 1647. A. A. Croll. | 1916. H. Woods. |
| 1653. H. Broadhead and G. Murdoch. | 1938. J. G. Pinede. |
| 1655. R. Davison. | 1975. E. Myers and H. Forbes. |
| 1656. C. Baulch. | 1981. J. G. Willans. |
| 1657. H. Brinsmead. | 2031. A. V. Newton. |
| 1661. J. C. Macdonald and J. Calverley. | 2050. A. Crulckshank. |
| 1662. M. E. Eyth. | 2057. W. Jackson. |
| 1665. J. Gimson. | 2116. F. Pragst. |
| 1668. H. A. Bonneville. | 2120. W. E. Newton. |
| 1671. G. A. Barrett, W. Exall, C. J. Andrewes, A. Barrett, and J. L. Bowhay. | 2145. G. Attock. |
| 1676. J. M. Croft. | 2176. W. Boulton and J. Worthington. |
| 1684. E. Edwards. | 2179. H. A. Bonneville. |
| 1691. E. Myers and H. Forbes. | 2180. H. A. Bonneville. |
| 1715. W. E. Newton. | 2484. C. Crowell. |
| | 2525. F. Lesley. |
| | 2574. G. H. Daglish & T. Windus. |
| | 2653. H. Cochrane. |
| | 2728. J. Tangye. |

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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| 3148. G. Sandys. | 3175. G. Dodman and W. Bell-house. |
| 86. E. C. Shepard. | 3180. I. Dimock. |
| 3182. W. E. Newton. | 3187. E. R. Burnham. |
| 3176. A. V. Newton. | 3172. W. Hill and H. Barber. |
| 41. W. Taylor. | |
| 53. W. Taylor. | |

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

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| 3079. J. Petrie & W. McNaught. | 3065. W. Irlam. |
| 3059. C. F. Varley. | |

Registered Designs.

Balance Trench Plough—4604—Dec. 11—Robert Dawes, Turnham-green, S.W.
Hand Rest—4605—Dec. 16—J. Banner, Exeter.
Repeating Linen and Paper Stamp—4606—T. R. Pinches, Oxendon-street, W.
Folding Wire Frame for Light Shades—4607—Dec. 22—Julius Zobel, 139, Euston-road, N.W.
Apparatus for Gussing Liquids—4608—Dec. 23—Wm. Smyth, Rotherham.
Wellington Blucher Shoe—4609—Dec. 24—R. H. Southall and W. Hallam, Manchester.
Spectacles—4610—Dec. 34—S. B. Solomons, Albemarle-street, W.
Watch-going fuses bottom—4611—December 30—F. B. Anderson, Birmingham.